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Remarks

Claims 1-5, 7, 8, 10, 11, 13, and 14 are now of record in this application. New claims 13 and 14 have been added. No claims have been amended or cancelled (claims 6, 9, and 12 were canceled previously).

Support for new claims 13 and 14 may be found in the original disclosure. Specifically, support for new claim 13, drawn to the specific crop materials being ensiled, may be found in the specification at page 6, paragraph no. 0013, lines 1-3. Support for new claim 14 may be found in claim 1. The claims are identical except that claim 14 recites the limitation "consisting essentially of" rather than "comprising".

Rejection Under 35 U.S.C. 103

Claims 1-5, 7, 8, 10 and 11 have been rejected under 35 U.S.C. 103 as being unpatentable over Myers et al. and Asrar et al. The Examiner has taken the position that it would have been obvious to add the PPO of Asrar et al. to the method of Myers et al. Applicants respectfully disagree.

Myers et al. (hereinafter referred to as Myers) is drawn to a method for preserving agricultural by-products which are very wet, including wet corn gluten feed (WCGF), dried distillers grains, and other by-products (see page 1, paragraph no. 0005,

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lines 5-10, paragraph no. 0006, and paragraph no. 0007). The material is treated with an organic acid in combination with an antioxidant and/or a surfactant (page 1, paragraph no. 0011). Rosemary extract including rosmarinic acid is disclosed as a preferred antioxidant. The organic acid treatment is explicitly selected to kill or prevent the growth of bacteria and yeasts, and "provide efficacy over a broad range of microorganisms" (page 1, paragraph no. 0013 and the Examples).

Asrar et al. (hereinafter referred to as Asrar) is drawn to a method for treating plants and seeds to improve the plant health or yield (page 1, paragraph no. 0003). The plant or plant propagation material (such as a seed, see page 6, paragraph no. 0078) is treated with an antioxidant and a pesticide in an amount to improve the health and/or yield of the plant (page 2, paragraph no. 0023). The term "improves plant health" is defined on page 6, paragraph no. 0075, and generally relates to the health of the growing plant or the ability of the seeds to develop into plants. Polyphenol oxidase (PPO) is listed among hundreds of potential antioxidants (pages 5-6, paragraph nos. 0058-0073, note 0066).

The instant invention is drawn to a method for inhibiting proteolysis of silage by pretreating the forage with a plant-derived polyphenol oxidase (PPO) in conjunction with an o-

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diphenol compound. In accordance with this invention, treatment of the forage with the PPO and o-diphenol compound prevents excessive pyrolysis of proteins. This is not disclosed or suggested by the prior art.

At the outset, applicants note that neither Myers nor Asrar are even remotely related to silage or ensiling as required by the claims of record. "Silage" (also known as ensilage) is defined by Webster's Third New International Dictionary of the English Language Unabridged (G. & C. Merriam, Springfield, MA, 1961, a copy of which is attached hereto) as:

"fodder (as of field corn, sorghum, grass, or clover) either green or mature converted into succulent winter feed for livestock through processes of fermentation usu. by being cut fine and blown into an airtight chamber (as a silo) where it is compressed to exclude air and where it undergoes an acid fermentation that retards spoiling - called also ensilage".

However, Myers is drawn to a method for preserving agricultural by-products which are very wet, such as wet corn gluten feed (WCGF) and dried distillers grains. None of these materials are silage or ensiled crops. The disclosure of a "silage bag" at page 4, paragraph no. 0043 of Myers is merely a reference to the type of container in which the treated material, wet distiller's grains and solubles (WDGS, note Table 8) was held. Wet distiller's grains and solubles (WDGS) are the cereal by-product

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of the distillation process to produce alcohol. They are not silage.

Asrar is even further removed than Myers. Asrar is drawn to a process for improving the health of growing plants or seeds growing into plants. In contrast, as noted above, silage is harvested crop material which is stored and fermented to produce animal feed.

The difference in the fields of application of the references from the claimed invention and each other not only fails to teach or suggest the instant invention, but also would teach away from the combination of the references. In brief, a practitioner skilled in the art would not add the treatment of Asrar, which is disclosed for improving the health of growing plants, to the treatment of Myers which is for preserving agricultural by-products. The by-products of Myers are obviously not viable. You can't "improve their health." Thus, the skilled practitioner would have no reason to add the treatment of Asrar to the treatment of the by-products of Myers.

Moreover, even if the references were combined as suggested, the combination would not arrive at the claimed invention. At best, the combination would result in a method for preserving wet agricultural by-products. Again these by-products are not silage. New dependent claim 13 has also been added to specify the particular crop material being ensiled.

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In addition to failing to disclose or suggest silage, applicants submit that the disclosures of the references would actually teach away from treating silage. Specifically, Myers expressly states that the object of the organic acid treatment is to kill or prevent the growth of bacteria and yeasts, and "provide efficacy over a broad range of microorganisms" (col. 2, paragraph no. 0013 and the Examples). However, as noted above, it is well known that the preparation of silage (or the process of ensiling) provides for the fermentation of the crop material by microorganisms. Thus, a practitioner skilled in the art seeking to produce silage would not employ a treatment such as disclosed by Myers which seeks to kill or inhibit a broad range of microorganisms. To do so would likely destroy or inhibit the microorganisms necessary for the acid fermentation during the ensiling.

Similarly, Asrar is drawn to the treatment of plants and seeds to improve plant health. However, silage is an animal feed. It is not a growing plant nor is it planted. A practitioner skilled in the art desiring to produce silage would not apply a treatment such as Asrar which is disclosed to improve the health of viable plants.

Finally, as disclosed in the instant specification at page 8, paragraph no. 0018, and page 10, paragraph no. 0022, in the

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process of the invention the added o-diphenol is converted by the polyphenol oxidase to o-quinones. These o-quinones react with proteases in the plant material, inhibiting their activity (and consequently preventing protein degradation). This is not disclosed or suggested by the prior art and is not expected from the disclosures of the references.

Rejection Under 35 U.S.C. 103

Claims 1-5, 7, 8, 10 and 11 have been rejected under 35 U.S.C. 103 as being unpatentable over Myers et al. and Tono et al. The Examiner has taken the position that it would have been obvious to add the polyphenol oxidase of Tono et al. to the method of Myers et al. Applicants respectfully disagree.

Myers and the instant invention were described in the response to the §103 rejection over Myers and Asrar, *supra*.

Tono et al. (hereinafter referred to as Tono) discloses the use of a polyphenol oxidase inhibitor as a preservative for vegetables and fruit (see the title and the abstract). This polyphenol oxidase inhibitor is prepared from an extract of Brassicaceae.

At the outset, applicants respectfully disagree with the Examiner's characterization of the disclosure of Tono. Specifically, contrary to the Examiner's assertion, Tono does not

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disclose using polyphenol oxidase (PPO) to treat fruit and vegetables. Rather, the reference discloses the use of a "polyphenol oxidase inhibitor" (emphasis added) for this purpose. An enzyme inhibitor is far different from the enzyme *per se*.

Applicants' arguments with respect to Myers which were presented in the response to the §103 rejection over Myers and Asrar, *supra*, are equally applicable here and are repeated.


Even if the references were combined as suggested by the examiner, the combination would result in the addition of a polyphenol oxidase inhibitor (of Tono) to the treatment of Myers. The combination still would not teach the use of the enzyme polyphenol oxidase.

In addition, Tono would actually teach away from the instant invention. As noted, Tono teaches using a PPO inhibitor. Thus, if anything, Tono would teach away from using PPO *per se*. A practitioner skilled in the art following the teaching of Tono would not add PPO (as required by the instant claims) when Tono teaches adding an inhibitor for that same enzyme.

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In view of the foregoing, applicants respectfully submit that claims 1-5, 7, 8, 10, 11, 13, and 14 distinguish over the prior art of record. Allowance thereof is respectfully requested.

Respectfully submitted,



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Attachments:

- Webster's Third New International Dictionary of the English Language Unabridged, G. & C. Merriam, Springfield, MA, 1961, page 2116 (2 pages).

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New International
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